

SPREAD EFFECTS FROM GROWTH CENTERS IN AND AROUND APPALACHIA: 1960-1990

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ABSTRACT: *A few decades ago growth center policy was present in some form or another in the regional policies of countries throughout much of the world. While the perceived failures of growth centers' abilities to stimulate geographically extensive development eventually led to the rejection of growth center strategies, such strategies may again be garnering favor. In the 1960s, the Appalachian Regional Commission (ARC) employed a growth center policy. Despite numerous analyses of Appalachia and the ARC, there is little research on the potential impact that a growth center strategy had upon economic conditions in the Appalachian Region. This research evaluates the spatial efficacy of utilizing growth centers to promote regional and rural development by analyzing economic change in the Appalachian Region between 1960 and 1990 using Appalachian growth centers and non-growth centers as a basis for analysis. It concludes that a growth center strategy was not only an unsuitable solution to Appalachia's most pressing problems, but is potentially an unsuitable policy for regional development elsewhere as well.*

INTRODUCTION

A broad range of literature suggests that throughout American history Appalachia has not fully shared in this country's economic success and, in some ways, the nation's social progress (Bradshaw, 1992; Hoover and Giarratani, 1984; PARC, 1964; Widner, 1990). Appalachia has consistently been home to some of the largest concentrations of impoverished people living in the United States (Moore, 1994; PARC, 1964). In the 1960s, the Federal government established the Appalachian Regional Commission (ARC), whose mandate was to improve the socioeconomic conditions of those living in Appalachia. At that time, academic literature as well as policymakers in general supported the notion that aiding growth centers was an effective means of regional development (ARC, 1970b; Berry, 1973; Hansen, 1971; Hirschman, 1958), and during the early years of the program, the ARC implemented, at least ostensibly, a growth center strategy (ARC, 1968; ARC, 1970a).

Growth center theory, possibly the most popular post-World War II regional development theory to date, was by the early 1970s present in some form or another in the regional policies of

countries throughout much of the world (Hansen et al., 1990; Richardson, 1976). It was envisaged as a means of encouraging regional development through the direct support of urban areas, with the expectation that such growth would "spread" or "trickle down" to other, typically rural parts of a region. Indeed, supporting growth centers was considered a viable means of addressing Appalachia's most pressing problems (ARC, 1970b; Berry, 1973; Hansen, 1971), even though such problems were more prevalent in Appalachia's most rural areas.

While growth center strategies fell out of favor in both the academic and policy realms by the mid-1970s, such strategies are being reconsidered as a viable means of regional development (Galston and Baehler, 1995; Schmitt, 1996 cited in Barkley et al., 1996; Henry et al., 1997). Thus, it may be important to examine, if not reexamine, the efficacy of growth center-based development. Assessing the experience of Appalachian growth centers as well as places hypothetically served by such centers could further inform growth center theory, especially in terms of the spatial extent of spread effects. However, while there have been a few analyses of socioeconomic change in Appalachia since the inception of the ARC, no research has utilized growth centers and non-

growth centers within the Appalachian Region as a basis for analysis.

This research uses county-level data to determine the economic experiences of three distinct groups of counties within Appalachia between 1960 and 1990: growth center counties, counties deemed to be within the range of influence of growth center spread effects, and counties deemed to be beyond the range of influence of growth center spread effects. Through defining counties by their relationship to growth centers in the Appalachian Region, this research offers a different means of assessing change than previous research on Appalachia, which has generally analyzed socioeconomic conditions at a broader regional level. Thus, this analysis can potentially further inform growth center theory and its inherent notion of spread effects, and it also provides a new means of assessing change in Appalachia by identifying places within the region in terms of their relationship to urban areas.

GROWTH CENTERS AND SPREAD EFFECTS

According to Moseley, "The notion of extensive spatial impact lies at the heart of growth center policy" (Moseley, 1973, p.57). Spread effects hypothetically include, amongst other things, the diffusion of investment and innovation to peripheral areas, enhanced backward linkages between urban industries and regional suppliers, a positive impact on income throughout a region, and expanding employment opportunities in areas beyond growth centers (Berry, 1973; Gaile, 1980; Hansen, 1971; Hoover and Giarratani, 1984; Robinson and Salih, 1971). However, these spread effects may be mitigated by backwash (Myrdal, 1957) or polarization (Hirschman, 1958) effects, which include various unfavorable impacts on the growth center's peripheral regions, typically their levels of income or economic and demographic structures (Gaile, 1980; Richardson, 1976).

Analyses of Spread Effects

In the early 1970s, when growth center theory had reached its apex, researchers attempted to

measure the magnitude and extent of spread effects (Berry, 1972; Casetti, et al., 1971; Moseley, 1973; Robinson and Salih, 1971). Though much of the research was concerned with developing particular types of models to measure such effects (Casetti et al., 1971; Robinson and Salih, 1971), Moseley (1973) attempted to explicitly measure the spatial extent of spread effects around Renes, France, where he found the range of such effects to be confined to 20-25 kilometers. He concluded that spread effects, in general, were spatially limited and that remote areas were immune to such effects. Indeed, possibly the biggest reason for the decline in popularity of growth center policy in the mid-1970s was the conclusion that spread effects were confined to relatively limited areas (Henry et al., 1997).

After what may be considered a brief hiatus, growth centers are again receiving attention in the academic literature: as a potential means of regional development (Galston and Baehler, 1995; Schmitt, 1996 cited in Barkley et al., 1996; Henry et al., 1997); through suggestions that growth centers may be revived as government planning tools (Hansen et al., 1990); and in research concerning spread effects (Hughes and Holland, 1994). While suggesting that a growth center strategy may be suitable for some areas but not others, Henry et al. (1997) found, similar to Moseley's research, spread effects generally limited to within 30 miles of an urban core. Other research (Hughes and Holland, 1994) rejects altogether the notion of growth centers as an efficacious means of regional development. In general, both past and current research suggest that the spatial extent of growth center spread effects is limited.

Analyses of Appalachia and the ARC

Despite numerous analyses of the ARC, there has been, perhaps surprisingly, little research concerning the ARC's experience with growth center policy or research that has used growth centers and non-growth centers in the Appalachian Region as a basis for analysis. While earlier research regarding the ARC was more broadly concerned with growth center policy in general or assessing various means by which the ARC might potentially develop the Appalachian Region (Gauthier, 1973; Hansen, 1971; Shellhammer, 1972), more recent research has typically analyzed socioeconomic change in Appalachia since the Commission's inception. Such

analysis has assessed change at both the regional (Bradshaw, 1992; Isserman, 1996; Widner, 1990) and county levels (Glasmeier and Fuellhart, 1999; Isserman and Rephann, 1995; Moore, 1994), which has more often than not led researchers to conclude that there has been significant improvement in the Appalachian Region over the past few decades (Bradshaw, 1992; Isserman and Rephann, 1995; Moore, 1994; Widner, 1990). What might be lost by using broader units of analysis are the experiences of individual types of places in the Appalachian Region. This research will primarily provide a new means of assessing change in Appalachia by distinguishing types of counties in terms of their relationship to urban areas. It is also a means of measuring spread effects from urban areas. Such spread effects, it is assumed, could either have been spontaneous or induced by ARC investments.

It is worth noting that this research does not analyze the ARC's growth center policy. ARC documents (ARC, 1970a; ARC, 1970b) and academic literature (Berry, 1973; Bradshaw, 1992; Hansen, 1971; Hansen et al., 1990; Isserman and Rephann, 1995; Moore, 1994; Widner, 1990) give varying accounts of the ARC's policy. While growth center theory generally advocates concentrating appropriations in relatively few growing areas (Hansen, 1971; Hoover, 1958; Hoover and Giarratani, 1984), early ARC documents indicate that the ARC dispersed appropriations throughout much of Appalachia. Well over 200 locales within the region—from cities as large as Pittsburgh to towns with less than 2,000 people—were officially designated growth centers by the ARC, and appropriations for some projects did not necessarily have to go to growth centers according to ARC policy (ARC, 1970a; ARC, 1970b). The extent to which the ARC actually employed a growth center policy would likely require a thorough evaluation of ARC expenditures. This analysis, rather than assessing the ARC's growth center strategy per se, evaluates the applicability of such a strategy for a region such as Appalachia. It provides, at the very least, a means of testing how Appalachia fared throughout much of the ARC's existence using a different basis of analysis than utilized in previous studies. Furthermore, all of what this analysis considers Appalachian growth centers were, at least in the early stages of the ARC program, considered growth centers by the ARC (ARC, 1970a; ARC,

1970b), and an extensive amount of appropriations, especially highway appropriations (ARC, 1997) went to what this analysis deems to be growth centers.

METHODOLOGY

This analysis distinguishes types of counties in and around Appalachia based upon their relationship to urban areas both within and proximate to the Appalachian Region. Counties are identified as being either growth center counties within the Appalachian Region, growth center counties outside but proximate to the Appalachian Region, Appalachian counties within the range of influence of growth centers, and Appalachian counties beyond the range of influence of growth centers. The collective experience of each type of county is then analyzed in terms of number of jobs per person, unemployment, and income using data from 1960, 1970, 1980, and 1990. This analysis defines a growth center county as any county that includes either the center or a significant portion of an "urbanized area" as defined by the 1990 census. Urbanized areas include all places and densely surrounding areas with a population of 50,000 or greater (U.S. Bureau of the Census, 1990). In 1990 there were 37 urbanized areas in Appalachia, and 55 counties within the region contained a significant part of at least one of these areas. For comparative purposes, and based upon the same criteria, this analysis also identifies growth center counties outside of the Appalachian Region. Any urbanized area whose edge is within 15 miles of the Appalachian border is considered a growth center outside of Appalachia, resulting in 31 urbanized areas outside of Appalachia located in 55 counties.

This analysis assumes that spread effects emanating from growth centers are generally limited to 30 miles beyond the urban area. This 30-mile limit, though somewhat arbitrary, is reasonably supported by previous work (Barkley et al., 1996; Moseley, 1973), and is probably a fair assessment considering Appalachian topography. Using a centroid approximation technique in ArcView GIS, counties whose centers are within a 30-mile limit of the edge of an urbanized area are considered to be within the range of growth center influence, while

counties not meeting this criteria are considered to be beyond the range of growth center influence. In this analysis, 190 counties are considered to be within the range of influence of growth centers, while 156 counties are beyond the range of influence of growth centers. In sum, there are four groups of counties studied in this analysis: growth center counties within Appalachia (55); growth center counties whose urbanized area is within 15 miles of the Appalachian border (55); counties within the range of influence of growth centers that are either within or outside of Appalachia (190); and counties beyond the range of influence of growth centers (156) (Figure 1).

Variables Used to Determine County-Level Change

Though the growth center literature offers various hypotheses concerning what types of growth may actually occur within and around growth centers, this paper will test for growth only in terms of income, a jobs/people ratio, and unemployment. Data are from both the U.S. Census Bureau and the Bureau of Economic Analysis (BEA). Income is measured using Per Capita Market Income (PCMI). PCMI is different than per capita income in that it does not include transfer payments, and it is therefore considered a better measure of county-level economic conditions (ARC, 1993). The jobs/people ratio is equivalent to the number of both full and part-time jobs within a county divided by a county's total population. Reliable data for total number of jobs and hence the jobs/people ratio were not available

prior to 1969. Unemployment refers to the unemployed civilian labor force. All of the variables used in this analysis, though referred to as being from 1960, 1970, 1980, or 1990, were actually gathered by the Census Bureau or the BEA during the respective previous years. The variables are compared to national averages, providing a means to test for relative growth or decline by type of county over time. To measure spread effects emanating from growth centers, visualization techniques using maps in ArcView GIS were utilized to determine if there were any patterns of employment and income growth in growth center counties and counties within the range of influence of growth centers.¹ As is always the case with using indicators, there are shortcomings with the variables used in this analysis; nonetheless, it is believed that these variables provide a relatively decent depiction of the spatial parameters of at least some spread effects, and, equally as important, provide an adequate basis for measuring economic change in Appalachia over time.

RESULTS

The results of this analysis suggest that there has been some, but limited, improvement in Appalachia during the period studied. Furthermore, there were apparently spread effects emanating from some growth centers in and around Appalachia since the 1960s, but these spread effects were both spatially limited and did not emanate from all of the growth

Table 1. Urban Areas (Growth Centers) in and around Appalachia

Growth Centers in Appalachia:

Altoona, PA; Anderson, SC; Anniston, AL; Asheville, NC; Binghamton, NY; Birmingham, AL; Bristol, TN/VA; Charleston, WV; Chattanooga, TN; Cumberland, MD; Decatur, AL; Elmira, NY; Erie, PA; Florence, AL; Gadsden, AL; Greenville, SC; Hagerstown, MD; Huntingdon/Ashland, WV/KY; Huntsville, AL; Ithaca, NY; Johnson City, TN; Johnstown, PA; Kingsport, TN/VA; Knoxville, TN; Monessen, PA; Parkersburg, WV; Pittsburgh, PA; Rome, GA; Scranton/Wilkes-Barre, PA; Sharon, PA/OH; Spartanburg, SC; State College, PA; Steubenville-Weirton, OH/WV; Tuscaloosa, AL; Williamsport, PA; Winston-Salem, NC.

Growth Centers Outside of Appalachia:

Akron, OH; Albany-Schenectady-Troy, NY; Allentown-Bethlehem-Easton, PA; Athens, GA; Atlanta, GA; Auburn-Opelika, AL; Buffalo-Niagara Falls, NY; Canton, OH; Cincinnati, OH/KY; Columbus, GA/AL; Columbus, OH; Frederick, MD; Gastonia, NC; Greensboro, NC; Hamilton, OH; Harrisburg, PA; Hickory, NC; High Point, NC; Kannapolis, NC; Lexington-Fayette, KY; Lynchburg, VA; Mansfield, OH; Memphis, TN/MS; Middletown, OH; Montgomery, AL; Newark, OH; Reading, PA; Roanoke, VA; Syracuse, NY; Utica-Rome, NY; Youngstown-Warren, OH.

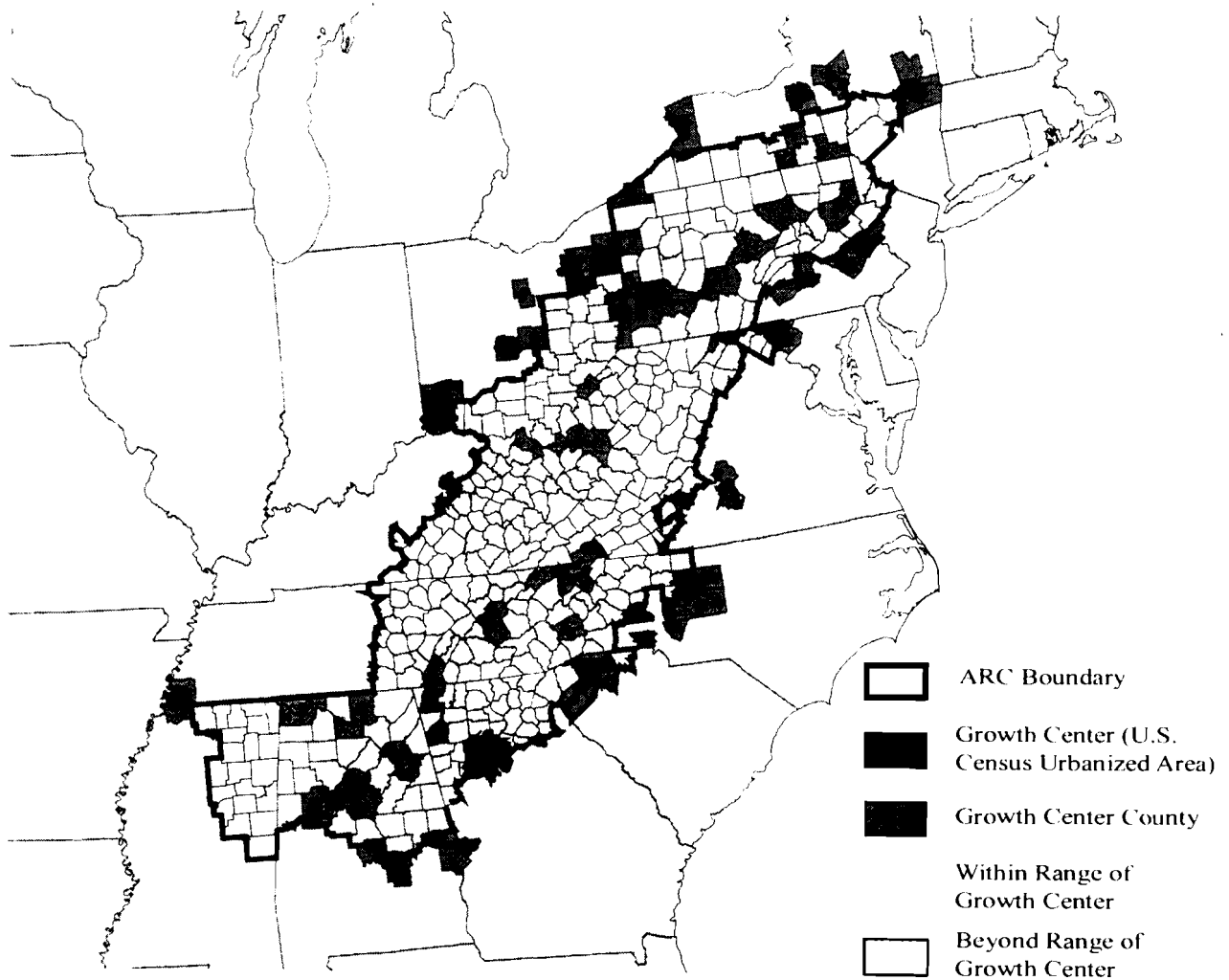


Figure 1: Growth centers and county typologies in Appalachia.

centers within and bordering the region. Furthermore, there appeared to be stronger spread effects emanating from the growth centers outside of Appalachia than there were from the growth centers within Appalachia. Another notable finding is the consistently poor performance, relative not only to the rest of the nation but to the rest of Appalachia as well, of the counties whose centers were more than 30 miles from the edge of urban areas.

The 55 growth center counties outside of Appalachia, as a whole, fared better during the period studied than the three other types of counties, and they also compared favorably with national averages (Table 2). In these counties, PCMI and unemployment rates were better than the national

average in all years except 1980. Furthermore, the jobs/people ratio was consistently better than the national average and showed relative improvement compared to the national average over time. In general, the variables used in this study suggest that between 1960 and 1990 the growth center counties outside of Appalachia had good and possibly improving economic conditions. Such was not the case for the growth center counties within Appalachia. Relative to the national average, the Appalachian growth center counties actually showed a decline between 1960 and 1990 in terms of income, while the jobs/people ratio remained relatively stagnant and the unemployment rate fluctuated

Appalachian Growth Centers

Table 2. Variables by Year and County Typology

	U.S.	ARC Growth Center	Non-ARC Growth Center	Within Range of Influence	Outside Range of Influence
PCMI 1960	\$1,639	\$1,506 (92)	\$1,712 (104)	\$1,126 (69)	\$945 (58)
PCMI 1970	\$3,490	\$3,104 (89)	\$3,503 (100)	\$2,513 (72)	\$2,133 (61)
PCMI 1980	\$7,909	\$7,173 (91)	\$7,788 (98)	\$5,906 (75)	\$5,250 (66)
PCMI 1990	\$15,636	\$13,863 (89)	\$15,871 (102)	\$11,498 (74)	\$9,420 (60)
Jobs/People 1970	.45	.44	.47	.36	.36
Jobs/People 1980	.50	.50	.54	.38	.40
Jobs/People 1990	.56	.55	.61	.43	.44
Unemp. 1960	5.14%	6.40% (125)	4.88% (95)	6.94% (135)	7.48% (146)
Unemp. 1970	4.37%	4.10% (94)	3.65% (84)	4.54% (104)	5.31% (122)
Unemp. 1980	6.52%	7.23% (111)	6.62% (102)	7.85% (120)	8.74% (134)
Unemp. 1990	6.31%	6.20% (98)	5.59% (89)	6.67% (106)	8.77% (139)

Unemployment and PCMI for all years from U.S. Census

Jobs and population to calculate Jobs/People Ratio for all years from Bureau of Economic Analysis

Numbers in parentheses equal the % of the national average

though was notably better in 1990 than it was in 1960.

Counties Within the Range of Influence of Growth Centers

The PCMI in counties that were within the range of influence of growth centers increased at a faster rate than in any of the other counties in the analysis, improving by 5% relative to the national average between 1960 and 1990. Nonetheless, by 1990 the PCMI in such counties remained less than three-quarters of the national average. Not only did the PCMI in these counties compare unfavorably with the national average in 1990, it remained significantly below the average PCMI of growth center counties both within and outside of the ARC Region by 1990. The jobs/people ratio in counties within the range of influence of growth centers consistently compared unfavorably with and actually declined relative to the national average over time, though this was countered by a noticeable improvement relative to the national average in unemployment rates during the period studied. Thus, it is possible that growth center counties, especially those outside of Appalachia that had remarkable job growth, were employing a significant number of people within their range of influence. Indeed, visual analysis indicated that the counties within but on the edge of the ARC Region and within the range of

influence of non-ARC growth centers, especially in Southern Appalachia, generally had rates of unemployment below the national average in 1990, and in this respect it would appear that the urban areas outside of Appalachia were increasing employment opportunities for some Appalachians.

Counties Beyond the Zone of Influence of Growth Centers

As previous analyses of spread effects from urban areas might have predicted, there was little evidence of spread effects in the counties that were deemed to be beyond the range of growth center influence. Such counties compared unfavorably with all other types of counties as well as national averages in each of the years studied. The unemployment rate in counties beyond the range of growth center influence was consistently high, close to one-and-a-half times the national average in both 1960 and 1990, while the jobs/people ratio declined relative to the national average over time. The PCMI in these counties remained low, improving only slightly from 58% in 1960 to 60% of the national average by 1990.

County-Level Trends in Spread Effects

An analysis of spatial trends using ArcView GIS indicated that the growth center counties that

grew the fastest during the period studied were generally outside of Appalachia or in the south. For example, there was exceptional growth in the number of jobs and income in growth center counties that included the urban areas of Atlanta, GA, Birmingham, AL, Memphis, TN, and Spartanburg, SC. However, there was also notable growth in counties that included Cincinnati, OH, Schenectady, NY, and State College, PA. In general, though, a visual analysis of growth in jobs and income clearly indicated that economic conditions in and around Southern Appalachia had improved at a faster rate than in counties in and around both Central and Northern Appalachia. Perhaps not surprisingly, most of the counties around growth centers that were the greatest beneficiaries of growth center spread effects were also in the South, and many were within the range of influence of growth centers outside of Appalachia, such as Atlanta: there was a clear pattern of counties within 30 miles of Atlanta that had improved their economic conditions. However, there were few distinguishable patterns elsewhere. For example, one county that was within the range of influence of Birmingham had significantly improved its economic conditions, but other counties within the range of influence of Birmingham had relatively little or only moderate improvements in jobs and income. Thus, it would appear that spread effects from growth centers had not emanated equally in all directions, and it was difficult to distinguish consistent patterns of growth center spread effects throughout Appalachia. Some urban areas and their surrounding counties, especially in the South, were growing; however, in such instances not all surrounding counties were growing. In other instances, growth center counties demonstrated little relative improvement during the period studied, but counties within their range of influence demonstrated significant improvement in jobs and income. Such improvement could have been due to numerous factors, including the lagging effects of spread effects from growth centers, or, more generally, suburbanization. To summarize, some counties within the 30-mile range of growth center influence seemingly experienced positive spread effects related to growth in their corresponding urban areas during the period studied, other counties experienced little or no spread effects at all, and some counties within the range of influence of growth centers grew while their corresponding urban areas did not grow. There

were few consistent patterns in spread effects throughout the region over time, suggesting that spread effects emanating from growth centers did not occur with any uniformity throughout the period studied.

CONCLUSION

By identifying counties based upon their relation to urban areas, or growth centers, this analysis, in contrast to previous analyses of the Appalachian Region, suggests that there has been only limited improvement in the economic conditions of much of Appalachia since 1960. This analysis also supports previous research that suggests spread effects from urban areas are spatially limited. It further indicates that spread effects do not emanate equally in all directions, providing evidence that areas within close proximity to urban areas do not always benefit from spread effects. Perhaps a most notable finding from this research is that 156 counties, more than half of all counties in the ARC Region, were determined to be beyond what previous analyses had suggested was the range of growth center influence; this calls into question the suitability of an urban-based strategy as a means of developing a region such as Appalachia. Though some areas in the ARC Region seem to have at least somewhat benefited from growth center spread effects, the areas in Appalachia with the greatest problems of unemployment, low income, and lack of jobs were beyond the zone of influence of growth centers throughout the period studied, suggesting that a strategy promoting urban growth was not a viable strategy for addressing the economic problems of such areas.

It seems doubtful that urban spread effects—whether spontaneous, induced by policy, or both—will ever significantly improve the economic conditions of Appalachia's most rural areas, which remain too far from urban areas either within or outside the region to enjoy the benefits of such effects. It was the most impoverished counties in Appalachia that inspired the establishment of the ARC (Widner, 1968), yet such counties seem to have been poorly served by the growth centers within and around the region. Moreover, many counties that

have been presumably within the range of growth center influence have shown little improvement compared to the rest of the nation over time. In general, many "growth centers" in Appalachia, especially in the northern and central parts of the region, were not growing during the period studied, and they did not seem to have the growth opportunities that would have been necessary to support spatially extensive development. It is important to note, however, that this analysis uses only economic indicators, and other analyses have demonstrated significant improvements in other socioeconomic indicators, such as those measuring health, throughout Appalachia since the ARC's inception. Nonetheless, by the economic standards used in this analysis, many Appalachian counties secured little relative economic improvement compared to the rest of the U.S. between 1960 and 1990.

When considering a growth center strategy, it is undoubtedly important to consider the spatial limitations of such a strategy. For places in close proximity to urban areas, supporting growth centers might be a viable means of development. However, this analysis suggests that not all places in close range to urban areas will experience positive spread effects from such areas. Moreover, beyond a limited range, growth centers have seemingly little or no impact. It is worth considering that, in an age marked by a globalized economy, urban areas often share greater connectivity with cities beyond their regional and even national borders than they do with communities only 30 miles away. Such considerations are important when assessing the future of Appalachian development. They should also be important to those who might propose implementing a growth center strategy as a means of rural development.

ENDNOTES

¹ Due to space limitations, these maps are not included in this article. For maps or other data used in this analysis, please contact the author.

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